

EA-6B UPGRADES



The EA-6B Prowler is a four-seat, all weather, twin turbojet powered, tactical aircraft designed to operate from aircraft carriers and airfields ashore. Its primary mission is the interception, analysis, identification, and jamming of enemy weapons control and communications systems in support of joint offensive and defensive operations. The crew includes one pilot and three electronic countermeasures officers. The EA-6B carries the ALQ-99 Tactical Jamming System (TJS), which includes the receiver, processor, and a selection of mission-configured jammer pods carried as external stores. Each jammer pod contains a ram air turbine generator, two selectable transmitter modules with associated antennas, and a universal exciter interfaced with and controlled by the On Board System (OBS) and aircrew. The modular open architecture of the jammer system optimizes transmitters and antennas for a given frequency range and tailors mission configurations. The EA-6B also has the USQ-113 Communications Jammer and may be armed with the high-speed radiation missile (HARM) for enemy surface-to-air radar destruction and suppression. The EA-6B supports aircraft survival through its contribution to the Suppression of Enemy Air Defenses (SEAD) Electronic Attack (EA) mission. Planned improvements include built-in-test capabilities to provide confidence in system readiness by maintenance personnel and system health by the aircrew.

BACKGROUND INFORMATION

Operational since 1972, the EA-6B has undergone a number of upgrades: Expanded Capability, Improved Capability (ICAP), and Improved Capability II (ICAP II). ICAP II, including major upgrades to HARM employment and updated communications, was installed on operational aircraft in Operation Desert Storm. Another significant upgrade, Advanced Capability (ADVCAP), reached Full Scale Development in FY93 but was dropped from the FY95 Navy budget submission and subsequently cancelled. IOT&E of ADVCAP was completed in 1QFY94. This program provided the technical basis for much of the current upgrade program. EA-6B improvements that are currently in development, test, or production are:

- a) Block-89A upgrade, which attained Initial Operational Capability in 4QFY00 and is a pre-requisite for the Improved Capability-III (ICAP-III) upgrade discussed below.
- b) Improvements to the ALQ-99 jamming pod capability that include the Universal Exciter Upgrade (Full-Rate Production in 4QFY96), Band 9/10 transmitter (IOC 1QFY00), a prototype Band 7/8 jamming capability (derived from the in-production Band 9/10 transmitter), and the engineering and manufacturing development phase Low Band Transmitter (LBT) upgrades.

- c) ICAP III, which includes a new tactical receiver to provide a reactive jamming capability and replaces the current 1960s era receivers. Additionally, ICAP III systems integrate many of the above mentioned warfighting enhancements with the addition of new controls and displays, allowing improved crew operation. It includes provisions for Link-16, via the Multi-Functional Information Distribution System. ICAP-III builds upon the Block-89A improvements to achieve integrated receiver connectivity and reactive jamming/targeting capability through accurate geolocation of active emitters. The procurement plan is to transition all EA-6B aircraft to the ICAP-III configuration by 2010.
- d) The USQ-113 (Version 3) Connectivity Upgrade that improves the capability to jam enemy communications. Addition of the Multi-Mission Advanced Tactical Terminal and the Improved Data Modem capability improves battlefield situational awareness for the crew. The program is also integrating Aircrew Night Vision Devices (NVD) to enhance night capabilities.

TEST & EVALUATION ACTIVITY

USQ-113 Version 3. DT was completed in April 2000. An Operational Test Readiness Review (OTRR) in May 2000 caused OPEVAL to be delayed until the program office addressed certain safety of flight issues involving the use of a laptop computer in the rear cockpit as an interface to the communications receiver/jammer capabilities. In October 2000, a second OTRR resulted in a successful certification for OPEVAL to begin. The first phase of OPEVAL began in January 2001 and completed in July 2001. COMOPTEVFOR's evaluation report is scheduled for submission in the near future. Upon approval of that report, 63 systems already produced will be fleet releasable. USQ-113 was already declared ready for Early Operational Capability in May 1999, and deployed to two fleet EA-6B squadrons in support of air operations over Serbia.

Low Band Transmitter (LBT). The Navy re-baselined the LBT upgrade to the ALQ-99 jammer in September 2000, slipping the program IOC from 3QFY04 to 2QFY05. MS III was extended from June 1999 to December 2001, and is now scheduled for FY04. During the program restructure, the Program Executive Officer (PEO) directed anechoic chamber tests of the transmitter/antennas. These tests took place in August 2000 with favorable results. EMD and DT&E activities continue to progress. Four EMD models are in production. The majority of 2001 T&E was contractor tests. An operational assessment (OA) is scheduled for the spring of FY03, prior to an LRIP decision scheduled for mid FY03.

ICAP-III. The Navy re-baselined the ICAP-III upgrade in May 2000 as a result of cost growth due to underestimating the complexity of the LR-700 receiver design, software, and development requirements. IOC slipped from 3QFY04 to 2QFY05. An LRIP decision is scheduled for early FY03, with an initial lot for 12 aircraft shipsets. There is a three month OA scheduled prior to the LRIP decision. A six month TECHEVAL follows to prepare for an OTRR in April 2003. OPEVAL is scheduled for July to November 2003.

TEST & EVALUATION ASSESSMENT

Of the EA-6B upgrades, the ICAP-III program risk is centered on development of the LR-700 receiver; without it, ICAP-III does not offer significant combat capability enhancements beyond new displays. However, an adequate receiver design and software development profile will enable ICAP-III

to provide a much needed reactive jamming and accurate emitter geolocation capability in full azimuth coverage.

In a new development schedule, the program office incorporated an OA, which will be very beneficial in adding time to do some initial tests and fix the resulting discrepancies prior to OPEVAL. Since ICAP-III integrates new and old avionics supporting all mission roles of the weapons system, the final OPEVAL should be a robust, comprehensive, and challenging flight test of the improved complete EA-6B's ability to jam and launch HARMs in a composite force, multi-ship environment.

LBT chamber tests in August 2000 were completed with no catastrophic failures and an assessment by the program office that the few problems encountered (e.g., four antenna RF switch failures) can be resolved within current program cost and schedule constraints. However, Automatic Leveling Control (ALC) and some Built-In-Test (BIT) functions were not incorporated in the unit used for chamber testing. The LBT risk council has assessed Navy testing at risk since FCC restrictions may impact the ability to successfully pass OT. Antenna development and function are also risk items.

USQ-113 Version 3 has completed OPEVAL and provides a greatly needed replacement for the Version 2, which is becoming not operationally mission capable due to a lack of replacement parts. The lack of an Operational Requirements Document for this congressional "plus up" funded program, has resulted in a complicating dearth of requirements definition. Preliminary results from the OPEVAL are that Version 3 has been found deficient in four areas: (1) the presence of the laptop remains a safety issue; wear and tear could nullify some of the measures taken in preparation for the October 2000 OTRR; (2) deficiency in display brightness control affects aircrew operations; (3) Windows based operator/software interface and system architecture complexity requires an inordinate reliance on the use of capability limiting special operating procedures; and (4) a classified function does not function correctly, and when operated it reduces overall system effectiveness.

The Block 89A and the Night Vision capability have been significant upgrades. The initial USQ-113 V3 units were sorely needed for V2 units that had no replacements, but its endorsement retains several caveats. The contributions of the LBT pod are yet to be demonstrated (test limitations are still being addressed). ICAP III, with the new LR-700 receiver, has recently been delivered to NAVAIR and will begin government testing.

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